for example a touchscreen device. The present technology employs a shape-changing display screen (that is optionally also touch-sensitive) having an array of shape-changing zones that can be individually actuated. Each of the shape-changing zones defines a pocket containing an electrically responsive gel (or other fluid that can be volumetrically modulated on application of an electric field). By applying electrical stimuli (in the form of an appropriate current or voltage), the shape-changing zones can thus be made to expand or swell into convexly shaped protrusions that are structurally and functionally akin to one or more magnifying lenses. Due to the optical properties of the resulting "lens", i.e. of the actuated shape-changing zone(s), onscreen information displayed beneath the lens is visually magnified. The lens is furthermore said to be "adaptive" because it can be controlled to appear or disappear on demand by the user or as required by a specific application, e.g. a navigation application to magnify a current position or a programmed route. The lens can thus be made to appear over a desired onscreen object, to follow a given route or path, or to appear in the location where the user touches the touchscreen. Alternatively, in lieu of an array of pockets containing shape-changing fluids or gels, a solid layer of shape-changing material can be used (e.g. a shape-changing polymer or alloy that deforms locally when subjected to locally focused electrical or magnetic stimulation).

[0025] Thus, an aspect of the present technology is a method of displaying information on a display of a handheld electronic device. The method includes steps of determining a target area onscreen to be visually magnified and causing a shape-changing zone of the display to change shape in the target area to visually magnify information displayed in the target area.

[0026] Another aspect of the present technology is a computer program product comprising code adapted to perform the steps of the foregoing method when the computer program product is loaded into memory and executed on a processor of a handheld electronic device.

[0027] Yet another aspect of the present technology is a handheld electronic device having a shape-changing touch-sensitive display screen comprising an array of shape-changing zones that can be individually electrically actuated to expand into a convex shape defining an adaptive magnifying lens that visually magnifies an area of the display screen beneath the lens. The device also has a processor operatively coupled to memory for executing an application configured to present information on the touch-sensitive display screen of the device and for controlling actuation of the one or more shape-changing zones of the touch-sensitive display screen.

[0028] One of the main applications of this technology is to magnify (or "zoom in" on) maps because generally unlike other types of graphics or plain text displayed onscreen, the ability to maintain the overall context and orientation of the map (by only magnifying the target area of interest) while keeping the peripheral contextual information as is represents a significant benefit to the user. Therefore, the primary application of this technology is directed to viewing maps, routes on maps, or magnifying the current position of the device as plotted in real-time on a map when the device is operating in navigation mode. However, this new technology can also be applied to any other information displayed onscreen, be it mere text (e.g. a MS Word document, a PDF, etc.), an image (e.g. graphics or a digital photograph) or any other information displayed onscreen for which the user may wish to magnify a portion of the information displayed onscreen. Although a substantial portion of the description that follows describes mapping technologies and how maps generated by these mapping technologies can be magnified using the novel shape-changing lens, it should be borne in mind that this novel technology can also be applied to other forms of onscreen information.

[0029] The details and particulars of these aspects of the technology will now be described below, by way of example, with reference to the attached drawings.

[0030] FIG. **1** is a block diagram of a communication system **100** which includes a wireless communications device **102** (also referred to as a mobile communications device or wireless handheld) which communicates through a wireless communications network **104**. For the purposes of the present specification, the expression "wireless communications device" encompasses not only a wireless handheld, cell phone or wireless-enabled laptop but also any mobile communications device or portable communications device such as a satellite phone, wireless-enabled PDA, wireless-enabled MP3 player, or wireless-enabled portable GPS navigation unit. In other words, for the purposes of this specification, "wireless" shall be understood as encompassing not only standard cellular or microwave RF technologies, but also any other communications technique that conveys data over the air using an electromagnetic signal. For the purposes of this specification, it should also be understood that the broader expression "handheld electronic device" encompasses not only "wireless communications devices", as defined above, but also any other non-wireless-enabled handheld electronic device such as a touch-sensitive electronic agenda, PDA, MP3 player, palm-top computer, etc. that does not have a radio-frequency transceiver unit for wireless communication. In other words, non-wireless-enabled devices (which download data using cable connections or which are pre-loaded with information, such as maps) can of course still take full advantage of this novel technology for magnifying onscreen information of particular interest to the viewer.

[0031] Notwithstanding the foregoing, the present technology has its greatest utility on a wireless communications device, such as the one introduced in FIG. **1**. Such a wireless communications device **102** preferably includes a visual display **112**, e.g. an LCD screen, a keyboard **114** (or keypad), and optionally one or more auxiliary user interfaces (UI) **116**, each of which is coupled to a controller **106**. The controller **106** is also coupled to radio frequency (RF) transceiver circuitry **108** and an antenna **110**. Typically, controller **106** is embodied as a central processing unit (CPU) which runs operating system software in a memory device (described later with reference to FIG. **2**). Controller **106** normally controls the overall operation of the wireless communications device **102**, whereas signal processing operations associated with communications functions are typically performed in the RF transceiver circuitry **108**. Controller **106** interfaces with the display screen **112** to display received information, stored information, user inputs, and the like. Keyboard/keypad **114**, which may be a telephone-type keypad or a full QWERTY keyboard, is normally provided for entering commands and data.

[0032] The wireless communications device **102** sends communication signals to and receives communication signals from network **104** over a wireless link via antenna **110**. RF transceiver circuitry **108** performs functions similar to those of station **118** and Base Station Controller (BSC) **120**,